REMARKS

I. Introduction

In response to the Office Action dated November 2, 2004, claims 1, 8, and 15 have been amended. Claims 1-21 remain in the application. Re-examination and re-consideration of the application, as amended, is requested.

II. Prior Art Rejections

In paragraphs (1)-(2) of the Office Action, claims 1-7, 8-10, and 14-17 were rejected under 35 U.S.C. §102(b) as being anticipated by Jannson et al., U.S. Patent No. 5,221,957 (Jannson). In paragraphs (3)-(4) of the Office Action, claims 11 and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Jannson in view Bowley et al., U.S. Patent 6,538,775 (Bowley). In paragraph (5) of the Office Action, claims 12, 13, 19, and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Jannson in view of Bowley and further in view of Ning, U.S. Patent No. 5,198,911 (Ning).

Specifically, the independent claims were rejected as follows:

> In regard to claims 1, 8, and 15, Jannson et al discloses (see for example, Figures 7, 9, 12, 22, 23, 25) a holographic filter (102, 114) or a method for filtering a spectra or an apparatus for filtering a spectra comprising multiple superpositioned holograms synthesize a filter shape with multiple peaks at specified positions; the filter shape matches a spectrum of a substance and the holographic filter is capable of being used to detect the substance as described in column 4, lines 1-27, column 6, lines 57-68, column 7, lines 1-68, column 8, lines 1-10, and 40-51, column 17, lines 39-60 and column 18, lines 17-40.

Applicant traverses the above rejections for one or more of the following reasons:

(1) None of Jannson, Bowley, or Ning teach, disclose or suggest precisely matching a filter shape to the spectrum of a substance; and

(2) None of Jannson, Bowley, or Ning teach, disclose or suggest detecting a substance by allowing a spectrum to pass through a filter simultaneously onto a detector.

Independent claims 1, 8, and 15 are generally directed to using a holographic filter to detect a substance. More specifically, the claims are directed towards a holographic filter having multiple superpositioned holograms. The multiple holograms synthesize and provide a filter shape. As amended, the filter shape precisely matches a particular spectrum of a substance. Further, the holographic filter is used to detect the substance. More specifically, the filter is used to detect the

particular substance by allowing the spectrum matching the multiple peaks for the substance to pass through the filter simultaneously onto a detector. In other words, the light from the illuminated substance passes through the multiple holograms in the filter simultaneously and onto a detector. Accordingly, the detector records a particular spectrum having multiple absorption/emission peaks simultaneously.

With the multiple peaks detected simultaneously, detection sensitivity and speed may be increased greatly compared with traditional methods. Further, the required data volume may decrease by several orders of magnitude, thereby enhancing the usability by remote sensing applications. In addition, since the filter allows a spectrum having multiple peaks to pass through simultaneously (rather than using multiple filters), complex and time-consuming calculations may be avoided.

The cited references do not teach nor suggest these various elements of Applicant's independent claims.

Jannson merely describes a holographic filter comprises a volume hologram recorded with Bragg surfaces for use in spectroscopic and spectral splitting applications. The Bragg planes in the holographic filter can be recorded to satisfy a design constraint imposed upon the filter such as Raman, Lippmann, non-Snellian (slanted), curved, and multiplexed spectral filters. The holographic filter achieves maximal reduction of secondary maxima and sidelobes and obtains large wavelength selectivities, and varied grating constants.

However, as noted throughout Jannson, Jannson is directed towards rejecting a particular spectral band width rather than using a filter to match light that has scattered in accordance with the present invention. As specifically set forth in Jannson's FIG. 8 (and supporting text in col. 6, lines 45-66) the rejected wavelengths are λ_0 and λ_1. The λ_2 wavelength is not rejected and is transmitted. Thus, instead, of letting the particular spectrum with various peaks pass through the filter, Jannson provides the opposite and rejects the peaks and only allows the flat signals through. In other words, as set forth in Jannson, the noise is filtered out resulting in a series of complex calculations to perform in order to identify a substance. The difference in rejecting the multiple peaks is further illustrated in col. 8, lines 40-50:

> FIG. 12 shows a multiplex holographic filter of the present invention wherein the rejection peaks of the two combined Lippmann filters are close enough together that the filter can be used as a transmission filter for the wavelengths between the two peaks. Again, the extreme flexibility of

> holographic fabrication would allow many different Bragg plane sets to be recorded in the holographic material, each Bragg plane set having a different diffraction constant Δ, such that a multiplicity of wavelengths in different discrete wavelength locations could be rejected, i.e., a series of rejection peaks would be present in an O.D. versus λ plot.

As illustrated in this text, the peaks are rejected and the wavelengths between the peaks are permitted to pass through. Jannson consistently rejects the peaks in the spectrum while allowing other light to pass through. Such a rejection is clearly distinguishable and fails to render the present invention obvious wherein the spectrum matching the multiple peaks passes through the filter onto a detector rather than being rejected.

In addition to the above, the other cited references also fail to cure Jannson's deficiencies. Moreover, the various elements of Applicant's claimed invention together provide operational advantages over Jannson, Bowley, and Ning. In addition, Applicant's invention solves problems not recognized by Jannson, Bowley, and Ning.

Thus, Applicant submits that independent claims 1, 8, and 15 are allowable over Jannson, Bowley, and Ning. Further, dependent claims 2-7, 9-14, and 16-21 are submitted to be allowable over Jannson, Bowley, and Ning in the same manner, because they are dependent on independent claims 1, 8, and 15, respectively, and thus contain all the limitations of the independent claims. In addition, dependent claims 2-7, 9-14, and 16-21 recite additional novel elements not shown by Jannson, Bowley, and Ning.

III. Conclusion

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicant's undersigned attorney.

Respectfully submitted,

GATES & COOPER LLP
Attorneys for Applicant(s)

Howard Hughes Center
6701 Center Drive West, Suite 1050
Los Angeles, California 90045
(310) 641-8797

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By: _____
Name: Jason S. Feldmar
Reg. No.: 39,187

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